A Pilot Study Exploring the Correlation Between Piezoelectric Monitoring and Traditional Methods of Measuring Heart Rate and Respiratory Rate in Patients Undergoing Surgery While Spontaneously Breathing

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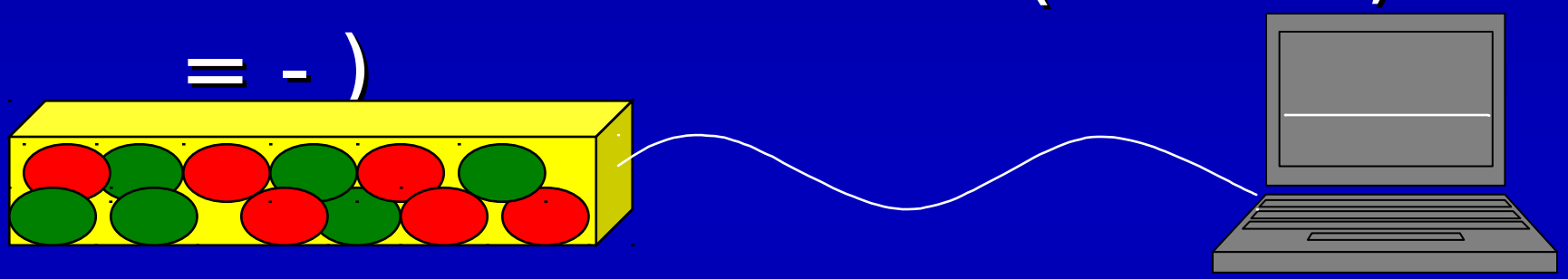
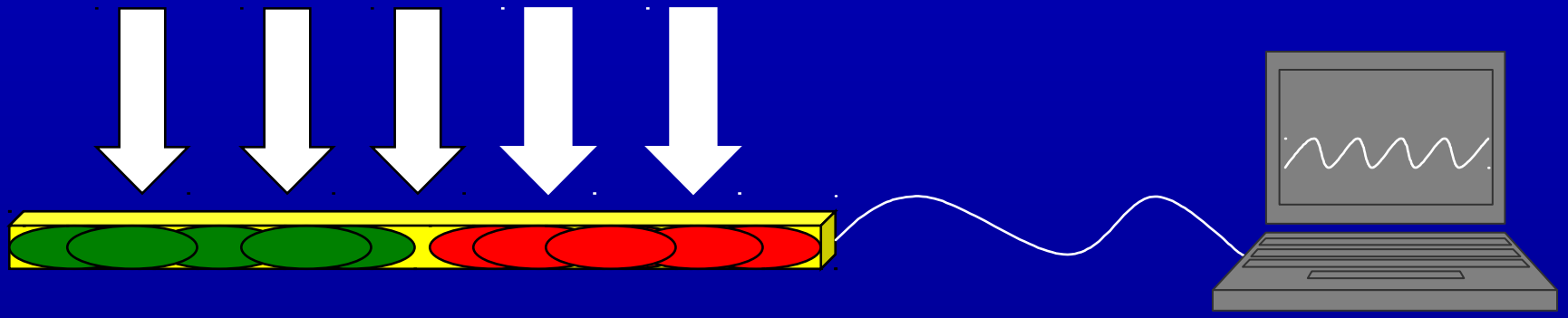
Significance of the Problem

Theoretical Framework

Piezoelectric effect (= +, = -)





Purpose of the Research and Research Question

The P2M has never been tested in an operating room setting or with sedated patients

- Does the P2M, using piezoelectric technology, correlate with standard monitoring equipment, for monitoring heart rate and respiratory rate in spontaneously ventilating patients undergoing regional anesthesia?

Population, Sample and Setting

- Tripler Army Medical Center
- Inclusion criteria
  - Spontaneously ventilating patients undergoing regional anesthesia with sedation
  - Elective lower extremity orthopedic procedures
  - Supine
  - Physical Status I or II
  - Age $\geq$ 18 years
  - Body Mass Index $\leq$30 kg/m^2
- Sample size: 30 patients

Demographic Data

n=30

Males = 23

Females =7

Physical Status I = 13

Physical Status II =17

		Mean	Std Dev
Ht (in)	69	.67	
Wt.(kg)	83		2.49
BMI (kg/m2)	26		.58
Age (yrs)	34	1.97	

Study Design

Correlation Study

- Heart Rate
  - P2M with PCS
  - P2M with ECG
- Respiratory Rate
  - P2M with PCS
  - P2M with $EtCO_2$

Methods

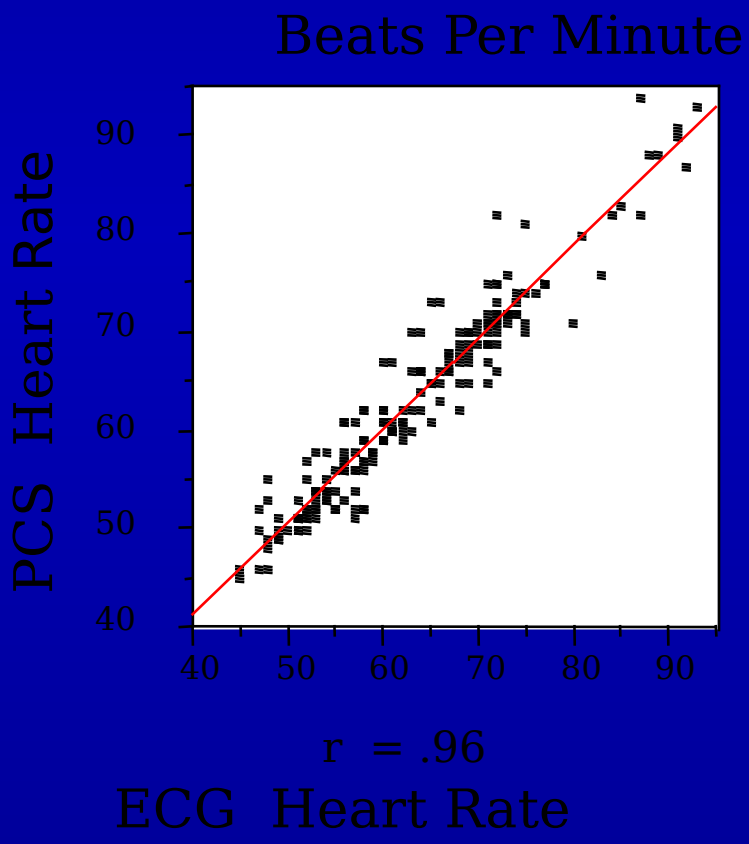
- Heart rate measured by PCS, ECG and P2M for 1 minute every 5 minutes for a period of 30 minutes

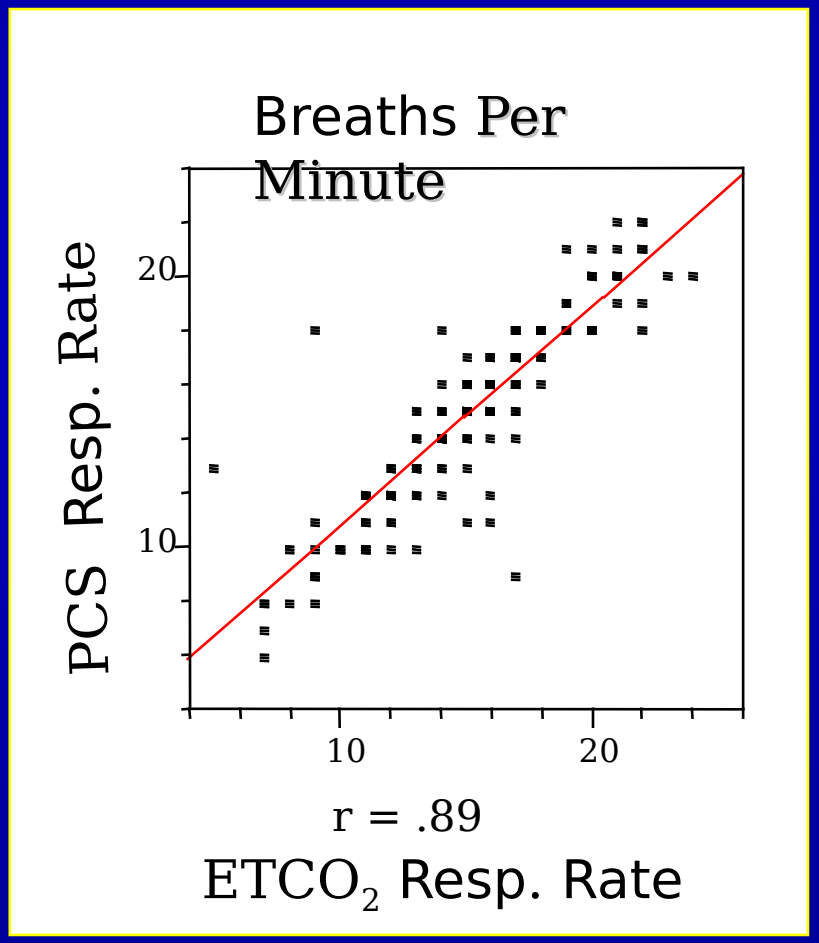
- Respiratory rate measured by PCS, $EtCO_2$ and P2M for 1 minute every 5 minutes for a period of 30 minutes

Data Analytic Strategy

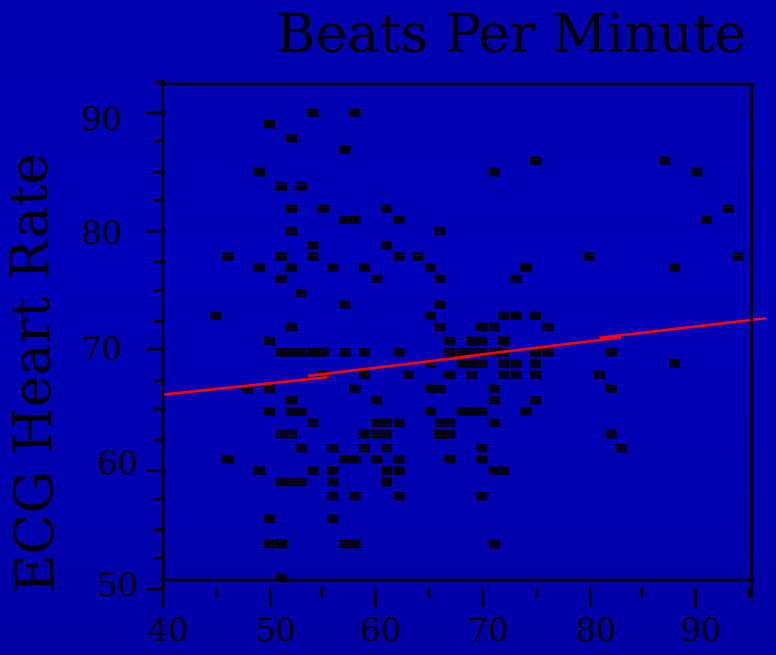
- Pearson’s product moment coefficient
- Linear regression
- ANOVA

Heart Rate and Respiratory Rate Among Standard Monitors



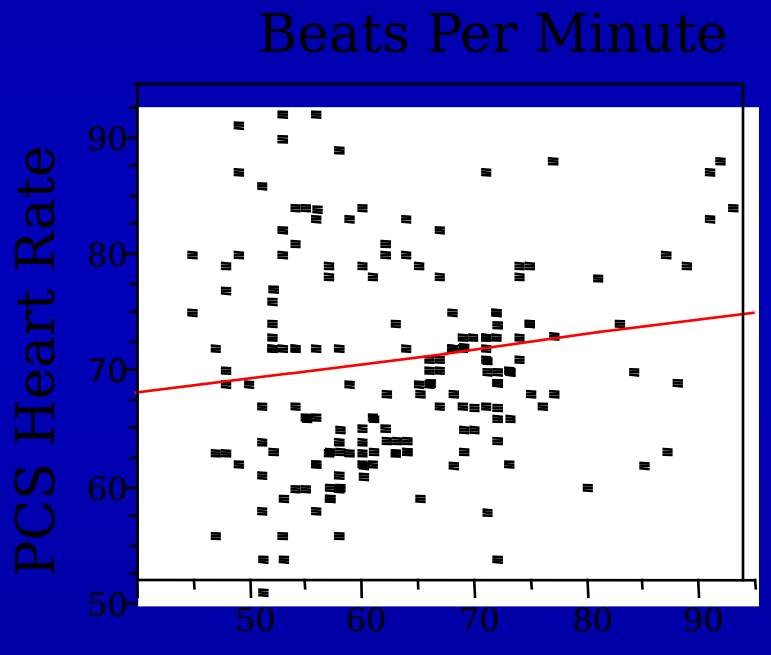


Heart Rate
P2M with standard monitors



r = .14

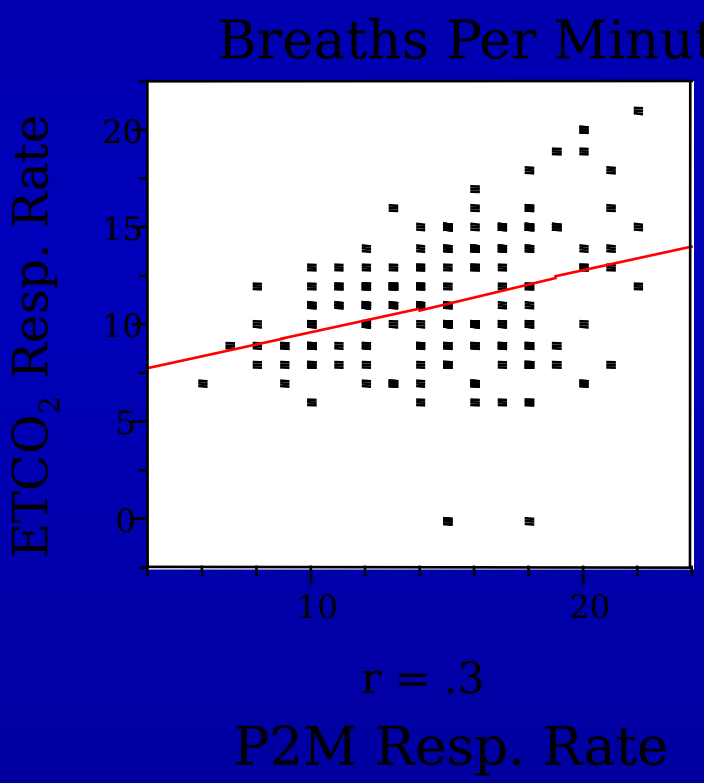
P2M Heart Rate

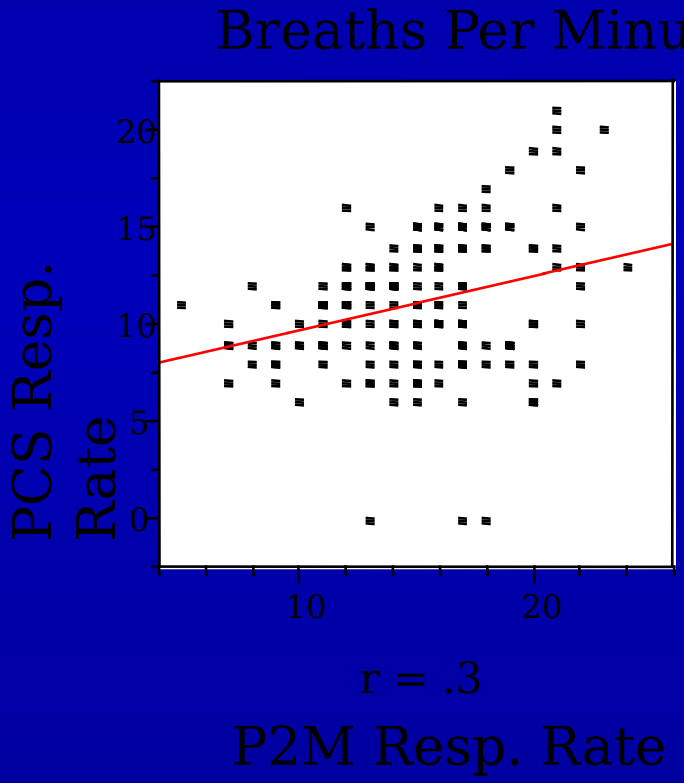


r = .14

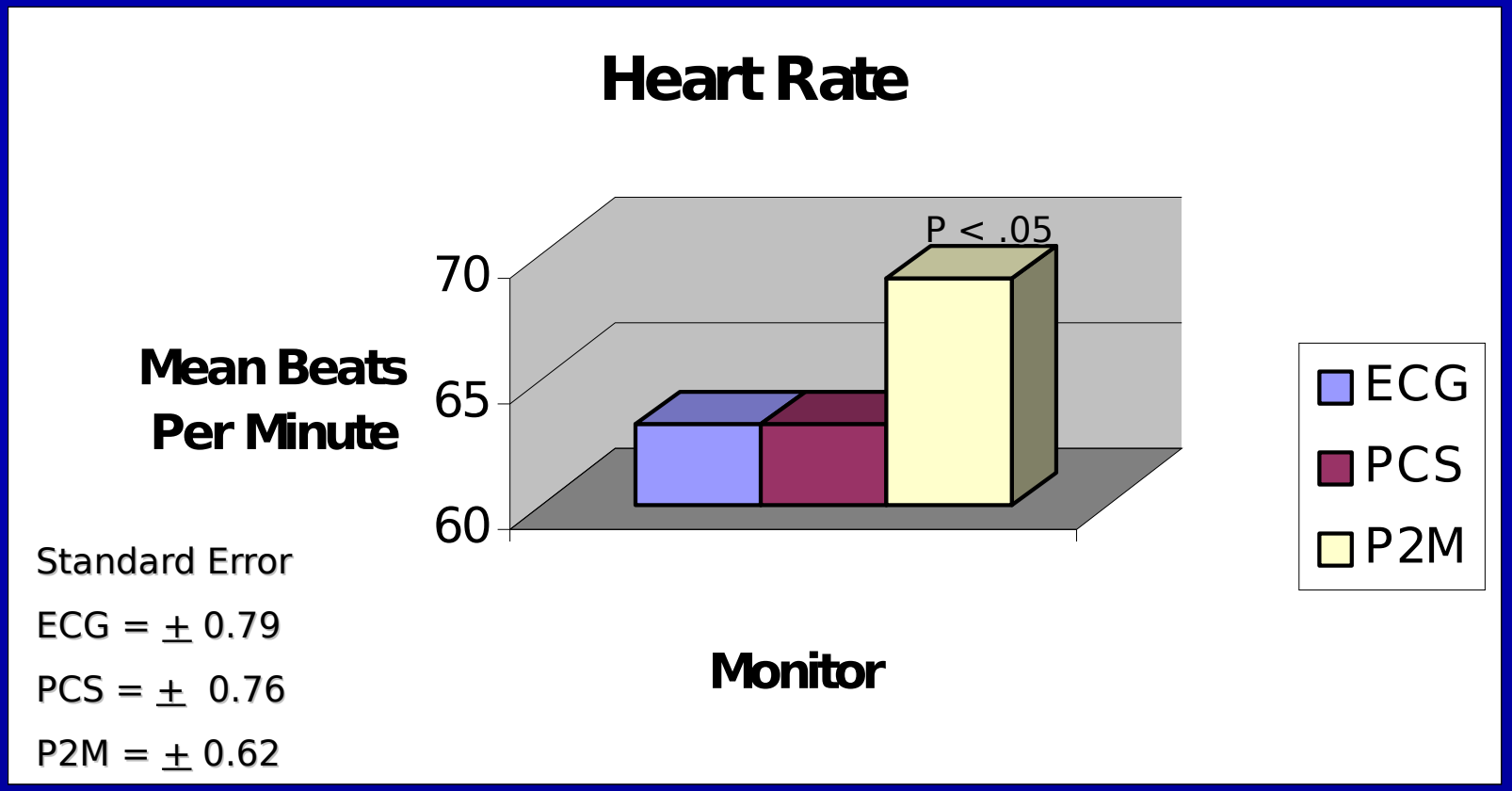
P2M Heart Rate

Respiratory Rate
P2M with Standard monitors





ANOVA
Heart Rate Means



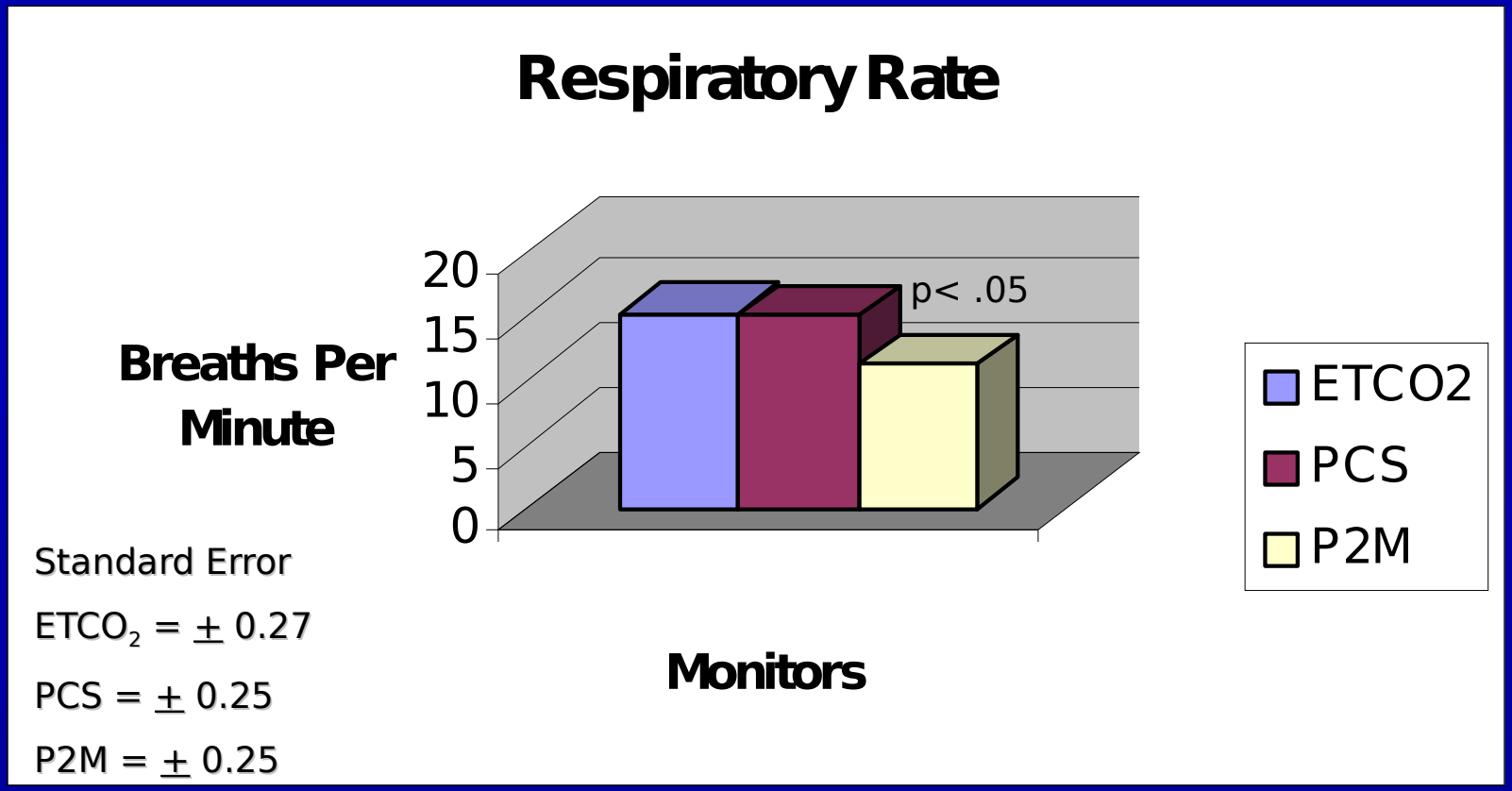
Standard Error

ECG = ± 0.79

PCS = ± 0.76

P2M = ± 0.62

ANOVA
Respiratory Rate Means



Standard Error

$ETCO_2 = \pm 0.27$

PCS = $\pm$ 0.25

P2M = $\pm$ 0.25

Summary